

tive path, and inner conductive patterns having an obliquely inclined shape disposed between the outer conductive patterns.

[0026] In another general aspect, a circuit board includes a first conductive layer including a signal line, a second conductive layer including a ground line, and an insulating layer disposed between the first conductive layer and the second conductive layer, wherein the ground line includes a pattern area in which the ground line intersects the signal line in a plan view by making a plurality of passes across the signal line, and a current direction in the ground line alternates in the plurality of passes across the signal line.

[0027] The plurality of passes across the signal line may include a first pass and a second pass across the signal line, and the current direction across the first pass may be configured to be substantially opposite to the current direction across the second pass.

[0028] The ground line may be patterned in a meander shape in the pattern area.

[0029] The current direction in the ground line may not change when a position of the signal line changes within a corresponding area of the ground line.

[0030] A conductive pattern structure for a circuit board includes outer conductive patterns disposed along an edge portion of a pattern area, and inner conductive patterns disposed in the pattern area and connected to one another via the outer conductive patterns to form a conductive path having a meander shape.

[0031] The inner conductive patterns may include obliquely inclined conductive stripes that are connected via the outer conductive patterns to form an oblique meander shape.

[0032] The inner conductive patterns may have a zigzag shape, a curved wave shape, or an obliquely inclined shape and may be connected to each other via the outer conductive patterns to form the meander shape.

[0033] The inner conductive patterns may include a first inner conductive pattern and a second inner conductive pattern, and the first inner conductive pattern and the second inner conductive pattern may be disposed parallel to each other such that a current direction through the first inner conductive pattern and a current direction through the second inner conductive pattern are opposite to each other.

[0034] Other features and aspects will be apparent from the following detailed description, the drawings, and the claims.

BRIEF DESCRIPTION OF DRAWINGS

[0035] FIG. 1 schematically illustrates an example of a circuit board used in an electronic component.

[0036] FIG. 2 illustrates a ground part of an example of a circuit board according to FIG. 1.

[0037] FIG. 3A is a cross-sectional view schematically illustrating an example of a circuit board.

[0038] FIG. 3B is a cross-sectional view schematically illustrating another example of a circuit board.

[0039] FIG. 4A is a cross-sectional view schematically illustrating another example of a circuit board. FIG. 4B is a cross-sectional view schematically illustrating yet another example of a circuit board.

[0040] FIG. 5 is a plan view schematically illustrating an example of a conductive layer having a ground line.

[0041] FIG. 6 is a plan view schematically illustrating an example in which a dummy pattern is applied to a conductive layer having a ground line according to FIG. 5.

[0042] FIG. 7 is a plan view schematically illustrating another example in which a dummy pattern is applied to a conductive layer having a ground line according to FIG. 5.

[0043] FIG. 8 is a plan view schematically illustrating another example of a conductive layer having a ground line.

[0044] FIG. 9 is a plan view schematically illustrating an example in which a dummy pattern is applied to a conductive layer having a ground line according to FIG. 8.

[0045] FIG. 10 is a plan view schematically illustrating another example in which a dummy pattern is applied to a conductive layer having a ground line according to FIG. 8.

[0046] FIG. 11 is a plan view schematically illustrating another example of the conductive layer having the ground line.

[0047] FIG. 12 is a plan view schematically illustrating an example in which a dummy pattern is applied to a conductive layer having a ground line according to FIG. 11.

[0048] FIG. 13 is a plan view schematically illustrating another example in which a dummy pattern is applied to a conductive layer having a ground line according to FIG. 11.

[0049] FIG. 14 schematically illustrates a signal return path of an example of a ground line patterned in an oblique meander shape.

[0050] FIG. 15 schematically illustrates a signal return path of an example of a ground surface patterned in a fill shape.

[0051] FIG. 16 schematically illustrates a signal return path of an example of a ground line patterned in a hatch shape.

[0052] FIG. 17 schematically illustrates a corresponding relationship for each of the positions of the signal lines of examples of ground lines patterned in the oblique meander shape and ground line patterned in the hatch shape.

[0053] FIG. 18 schematically illustrates a simulation result of characteristic impedance for each of the positions of the signal line of the examples of ground lines patterned in the oblique meander shape and the examples of ground lines patterned in the hatch shape.

[0054] Throughout the drawings and the detailed description, the same reference numerals refer to the same elements. The drawings may not be to scale, and the relative size, proportions, and depiction of elements in the drawings may be exaggerated for clarity, illustration, and convenience.

DETAILED DESCRIPTION

[0055] The following detailed description is provided to assist the reader in gaining a comprehensive understanding of the methods, apparatuses, and/or systems described herein. However, various changes, modifications, and equivalents of the methods, apparatuses, and/or systems described herein will be apparent to one of ordinary skill in the art. The sequences of operations described herein are merely examples, and are not limited to those set forth herein, but may be changed as will be apparent to one of ordinary skill in the art, with the exception of operations necessarily occurring in a certain order. Also, descriptions of functions and constructions that are well known to one of ordinary skill in the art may be omitted for increased clarity and conciseness.